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UNIVERSITY OF ALBERTA

INTERPERSONAL DISTANCE AND POSITIVE REINFORCEMENT

by

Anthony D. Skorjanc

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF ARTS

DEPARTMENT OF SOCIOLOGY

EDMONTON, ALBERTA

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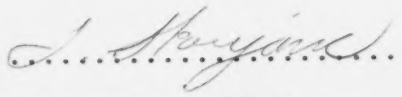

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled: "Interpersonal Distance and Positive Reinforcement," submitted by Anthony Dean Skorjanc in partial fulfillment of the requirements for the degree of Master of Arts.

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Dr. M. Enzle

Date: July 15, 1983

DEDICATION

I dedicate this thesis to my Aunt Hedi and Uncle John Wagner for opening their hearts and home to me during a crucial time in my academic career.

ABSTRACT

Hypotheses regarding the effect of positive reinforcement on interpersonal distance preferences were tested. Reinforcement theory predicts that persons reinforced at large or small interpersonal distances would maintain similarly large or small interpersonal distances in the future. Preferred interpersonal distance was measured via unobtrusive observation of the distance subjects maintained between themselves and another person. Points, later exchangeable for lottery tickets, served as the reinforcement.

Only one of the reinforcement conditions resulted in a statistically significant change in preferred distance. In this condition, the positive reinforcement expanded subjects' interpersonal distance preferences. The distance measurements of subjects reinforced to reduce their distance preferences were not significantly different from the control group. The subjects' ratings of their mood (via Likert scales) at a neutral distance, were unaffected by prior attempts to either expand or reduce their interpersonal distance preferences according to the reinforcement schedule. Skin conductance was unassociated with distance preferences, and also unaffected by the reinforcement schedule. The methodological limitations on this research and suggestions for future studies are discussed.

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INTRODUCTION

Several studies over the last three decades have examined interpersonal distance, that is, the distance separating one individual from another during social interaction (Gilmour & Walkey, 1981; Harrell, 1979; Hayduk 1978, 1981, 1983; Hildreth, Derogatis, & McCusker, 1971; Kinzel, 1970; Konecni, Libuser, Morton, & Ebbesen, 1975; Roger & Schalekamp, 1976; Skorjanc, 1991; Sommer, 1969, Strube & Werner, 1982; Sundstrom & Altman, 1976; Thompson, Aiello, & Epstein, 1979). Nowhere among the many variables explored within this context, has a study systematically examined the use of reinforcements as an implicit determinant of interpersonal distance. While standard or shared culture can predict similarities among individuals within cultures (Roger & Schalekamp, 1976), it is unable to account for the differences among individuals. Hence, we need an explanation identifying the sources of the substantial individual variations in interpersonal distance preferences. If interpersonal distance is dependent on reinforcers, then intervention strategies for strengthening individual's preferences might be developed [e.g., to reduce the unusually large distances maintained by violent offenders (Kinzel, 1970)]. The present study was designed to explore the relationship between interpersonal distance and positive reinforcement by assessing whether positive reinforcers can modify individuals' interpersonal distance preferences.

Interpersonal Distance

Research on interpersonal distance (Sundstrom & Altman, 1976) demonstrates that there is an optimal distance preferred by individuals, that is, distances that are too large or too small are experienced as uncomfortable. The distance between two interacting individuals is a function of their optimal distance preferences and can be referred to as their interpersonal distance preference. If a stationary individual is approached by another person, the distance at which the approacher stops, is the approacher's interpersonal distance preference. This distance is the preferred interpersonal distance preference of both individuals, if the stationary individual displays no reaction or signs of discomfort.

Operant Conditioning and Positive Reinforcement

Operant (or instrumental) conditioning refers to a process in which emitted behavior is strengthened or suppressed as a result of the consequences of the behavior (Reynolds, 1975). Operants are behaviors that act or "operate" on the environment to produce consequences, which are in turn affected by these consequences (Nye, 1979). Any event that increases the likelihood that the behavior it follows will recur in the future is defined as a reinforcer (Fantino and Logan, 1979). In the case of positive reinforcers, the behaviors they follow are made more probable by their occurrence. For example, an individual who stands near another person (emitted behavior) and is subsequently rewarded with

a lottery ticket (positive reinforcement) is likely to repeat this behavior in the future.

Skinner's approach to operant conditioning and positive reinforcement focuses specifically on phenomena that are directly observable and does not go beyond (1) stating that consequences do strengthen behavior, and (2) accounting for the conditions under which this strengthening effect occurs. Based upon these Skinnerian principles of reinforcement, it can be argued that an individual presented with a positive reinforcement for maintaining a small interpersonal distance will emit a similar behavior in the future. If a relatively small interpersonal distance is maintained the next time the individual approaches another, then the reinforcer is successful for reducing the size of his/her interpersonal distance preference.

Similarly, if a positive reinforcer is presented to an individual for maintaining a large interpersonal distance, then we could expect that individual to maintain a similarly large interpersonal distance on future occasions.

Points as Reinforcers

Recent research has demonstrated that points which can be exchanged for money or lottery tickets are significant reinforcers for strengthening subject's emitted behaviors in experimental settings (Bennett & Samson, 1987; King & Logue, 1990; Kimoto, Shimamune, & Jitsumori, 1989; Torgrud & Holborn, 1990). The

present study used points (exchangeable for lottery tickets) as positive reinforcers to strengthen individuals' operant behaviors (e.g., approaching and standing near another person).

Variables

A study conducted by McBride, King, and James (1965) found a social proximity effect on subjects' skin conductance. In this study, skin conductance served as a control variable as well as a possible alternative to other measures of the reinforcement effect (e.g., there may be a physiological response and some or no change in the size of the individual's interpersonal distance preference).

The measures of age, gender, height and weight were also used in the present study. According to Hayduk (1978, 1983) there are mixed findings linking these variables to interpersonal distance. In view of this, these variables are used only as controls in the data analyses. Individuals' feelings also served as a control variable in the regression analyses. These included feeling: 1) threatened through secure, 2) comfortable through uncomfortable, 3) nervous through calm, and 4) embarrassed through self-assured served .

Hypotheses

Hypothesis 1

Preferences for greater interpersonal distancing will be strengthened when greater interpersonal distances are reinforced.

Hypothesis 2

Preferences for lesser interpersonal distancing will be strengthened when lesser interpersonal distances are reinforced.

Ethical Concerns

For the present study, an experiment was conducted using university students as subjects and points (exchangeable for lottery tickets) were used as reinforcers. The subjects were reinforced to either reduce or expand their interpersonal distance preferences. The experiment followed an ABA, BAB design to reveal any sequencing effects of the treatments and to overcome any net lasting effect on the subjects. Initial reinforcers, which were presented to modify a subject's interpersonal distance preference, were followed by subsequent reinforcers designed to return the interpersonal distance preference back to it's original size.

METHODOLOGY

Brief Overview of the Experiment

Subjects arrive at the laboratory one at a time and are asked (by the experimenter) to proceed along a corridor of tables towards the assistant (at position A1 in Figure 1). Once the subject stops approaching the assistant, the **First** distance is unobtrusively noted (mentally) by the assistant, and used to assign the subject to the Reduce-Then-Expand or Expand-Then-Reduce condition. The assistant then directs the subject to approach the Experimenter's Table to connect him/herself to a skin conductance monitor and the assitant takes the position at A2 (in Figure 1). The subject is then told a cover story (see Appendix A) that the purpose of the experiment is to determine different styles of search procedures. The subject is told that the 10 poles (labelled A through E) correspond to slips of paper located in the boxes labelled 1 through 6 and that he/she should select a slip of paper from box number 1 and then go stand directly in front of one of the poles that corresponds to the letter indicated upon the slip of paper. The subject is then told he/she may select a card from the pole box where they stand, the letters upon which correspond to points that are exchangeable for Western Express lottery tickets at the end of the experiment. The subject is then instructed to select slips of paper from the 5 remaining boxes and stand in front of the corresponding 5 poles (one at a time) from which they will choose

more cards with letters that correspond to points.

Once the subject approaches a post (located closer or more distant from the assistant), Likert and Skin conductance measurements are made and reinforcers are presented according to reinforcement schedule. The assistant then goes back to position A1 while the subject disconnects him/herself from the skin conductance monitor. On the pretext of obtaining more instructions from the assistant, the subject approaches the assistant at A1 for a **Second** unobtrusive distance measurement. The next instructions are to repeat the cover-story search task.

The subject then reattaches him/herself to the skin conductance monitor (as the assistant resumes position A2) and receives counterbalancing reinforcers for approaching posts located closer or further from the assistant. Likert and skin conductance measurements are again recorded for the approaches. While the subject is disconnected from the monitor the assistant once more resumes position A1. The subject then approaches the assistant for the **Third** unobtrusive distance measurement on the pretext of obtaining more instruction from the assistant.

After the Third distance measure is recorded the subject is debriefed, probed for suspiciousness and dismissed.

The reason for including three distance measures is that the First distance measurement is a baseline interpersonal distance preference for the subject. Subjects are then presented reinforcers at posts located closer to or further from the

Figure 1

Laboratory Layout

A1, A2 = Position of Assistant

assistant, in an attempt to manipulate the Second, and subsequent Third distance measurements.

This cover story does not imply any exchange rate for the points received by subjects and the number of lottery tickets allocated at the end of the experiment. Subjects are left to orientate themselves to the search task and to calculate their own relative value for the points during the course of the experiment as various point allocations are made. Due to the complexity of the task and the non-specific nature of the search strategies, we anticipate that most subjects felt somewhat disorientated or at least some degree of uncertainty during the initial trials. We could also anticipate that while this uncertainty was never fully dissipated, the repetitive nature of the task, with specific choice points provided a framework for continuing interaction in the experimental setting. Subjects' personal experiences for their approaches on the assistant are relative to what each subject perceives during his/her approach. For example, one subject may perceive the assistant as threatening while another will perceive the assistant as comforting.

Subjects

The subjects for this experiment were 33 female and 24 male undergraduate students enroled in Introductory Sociology courses at the University of Alberta. Their ages ranged from 18 to 38 years, with a mean of 20.7 years. All subjects participated on a

voluntary basis and received no course credit. Some subjects were assigned to serve as controls while others were assigned to one of the two experimental groups. Subjects with large initial interpersonal distance preferences were assigned to the Reduce-Then-Expand group (ABA), while those displaying small initial interpersonal distance preferences were assigned to the Expand-Then-Reduce group (BAB).

Apparatus

Research Assistants

The experiment was conducted by an experimenter (the author) and two assistants. The experimenter was a slender 28-year-old male Caucasian, 185 cm. tall, while both assistants were slender 27 year old female Caucasians standing approximately 165 cm. tall.

Room Layout

The experimental setting was a lecture room containing tables and chairs arranged as in Figure 1 so that a row of 6 tables made a corridor 7 metres long and 1.2 metres wide running along the right wall. The Assistant's Desk was situated at the far end of this corridor. A sign labelled "ASSISTANT" was taped to the front of the desk and the assistant stood at the same position (A1) near the desk for each of the unobtrusive distance measurements. A clipboard with distance record sheets (see Appendix B) was on the table. The floor tiles along the corridor leading up to the desk

were marked with unobtrusive distance indicators.

Target Poles

A total of 10 poles (target poles) were labelled in pairs A,A, B,B, C,C, D,D, E,E and positioned as indicated in Figure 1. Each pole consisted of a small paper box glued on top of a 1 metre high wooden shaft stuck into a brick base. Similarly labelled poles (eg. B and B) were equi-distant from position A2, where the assistant stood when not at the Assistant's Desk for the distance measurements. Each of the two 'A' poles were positioned 25 cm away from the assistant's position (A2), the two 'B' poles 60 cm away, the two 'C' poles 95 cm away, the two 'D' poles 130 cm away, and the two 'E' poles located 165 cm away from the assistant's position. The boxes (pole boxes) each contained several file cards, which were labelled with random 2 letter combinations (e.g., XT, ZQ, WX etc.).

Target Pole Specification

Two sets of 7 cardboard boxes were on a table located near the centre of the room. Each set of boxes was numbered 1-6, with the last of each labelled "USED". Each numbered box held several folded slips of paper with one letter (A,B,C,D, or E) on it. The boxes labelled "USED" were empty). Only one letter (eg. C) was assigned to a particular box. For the first set of boxes, every slip of paper in box 1 was labelled "C", the slips of paper in box

2 were labelled "B", and so on. Set one was used for the Expand-reinforcement trials, and set two was used for the Reduce-reinforcement trials. (See Appendix C for the details of the target pole designation in each of the boxes). Subjects selected from these boxes and used the letters on the slips of paper to determine which of the poles they approached, thereby also determining how close they approached the assistant at A2.

Experimenter's Table

On the Experimenter's Table were (1) a list of instructions for the subjects, (2) four reinforcement schedules, (3) record sheets to record monitor readings and Likert scale scores (see Appendix D), and (4) an electronic skin conductance monitor connected to a 6 m cable attached to two velcro finger-tip fasteners.

Measurement

Three interpersonal distance preference measurements were made for each subject: First (baseline), Second (reinforced away from baseline) and Third (reinforced back towards baseline).

At each of the target pole locations, measurements were made for the subjects' skin conductance and their feelings on 4 different Likert scales. Subjects were measured a total of thirteen times for skin conductance (1 baseline and 12 target pole approach measurements). Subjects were also measured a total of

twelve times for each of the 4 Likert scales (at every target pole approach). The other measurements included subjects' height, weight, age, and gender.

Front wall

Two posters of the four Likert scale questions were strategically placed on the front wall of the laboratory, immediately behind and just to each side of the assistant's A2 position, thereby manipulating the subject into facing, and looking, in the direction of the assistant during specific parts of the experiment. This helped to keep the subjects from looking or facing away from the assistant when the experimenter asked the Likert questions. Furthermore, the posters were designed to help subjects visualize where their feelings might fall on each of the Likert scales thus allowing for more accurate responses.

Procedure

Subjects were scheduled to arrive one at a time and were met in the hallway outside the laboratory by the experimenter, who asked the subject to come into the laboratory and walk (down the corridor) over to the research assistant (at position A1) for instructions. In order to eliminate any effects that eye contact might have on how closely the subject approached, the assistant always turned her head to the side and looked down at the clipboard until the subject had stopped approaching. The assistant's feet

and body were oriented directly down the corridor, so this seemed like a frontal approach to the subject even though the assistant's head was turned slightly aside. The distance from the assistants' toes to the subject's closest toe was mentally noted (in the mind of the assistant) and the subject was asked to go to the Experimenter's Desk for further instructions. The distance in centimetres (First distance preference) was then recorded (on record sheet 1) by the assistant.

After the subject's First distance preference was recorded, the assistant signalled the experimenter (with a raised finger) if the distance was greater than 60 cm, and then walked to position A2. The signal informed the experimenter which of the two reinforcement conditions the subject was in (see Figure 2), and the experimenter positioned the appropriate 7 target location boxes on the table to make them accessible to the subject. The subject entered the First-Reduce-Then-Expand condition if their initial distance preference was greater than 60 cm, and the First-Expand-Then-Reduce condition if their initial distance preference was less than 60 cm[1] .

---

[1] The 60 cm criterion was used because the mean-stop distance measure for frontal approaches on university students in Hayduk's 1981 study is approximately 60 cm (p. 89).

Figure 2

Reinforcement Schedules 1 & 2

(1a) Reinforcement schedule for the reduce segment of the First Reduce Then Expand group (i.e., initial interpersonal distance preference >60 cm).

Reinforcement Schedule --------->	Start:	C =	1000 points
(Location and Points Allocated)	2nd	D =	0 points
	3rd	B =	2000 points
	4th	A =	7000 points
	5th	A =	8000 points
	6th	A =	9000 points

(1b) Reinforcement schedule for the expand segment of the First Reduce Then Expand group.

Reinforcement Schedule --------->	Start:	C =	1000 points
(Location and Points Allocated)	2nd	B =	0 points
	3rd	D =	2000 points
	4th	E =	7000 points
	5th	E =	8000 points
	6th	E =	9000 points

(2a) Reinforcement schedule for the expand segment of the First Expand Then Reduce group (i.e., initial interpersonal distance preference <60 cm).

Reinforcement Schedule --------->	Start:	C =	1000 points
(Location and Points Allocated)	2nd	B =	0 points
	3rd	D =	2000 points
	4th	E =	7000 points
	5th	E =	8000 points
	6th	E =	9000 points

(2b) Reinforcement schedule for the reduce segment of the First Expand Then Reduce group.

Reinforcement Schedule --------->	Start:	C =	1000 points
(Location and Points Allocated)	2nd	D =	0 points
	3rd	B =	2000 points
	4th	A =	7000 points
	5th	A =	8000 points
	6th	A =	9000 points

(Note that the last two schedules are the same as the first two schedules, but in reverse order).

Task explanation

After arriving at the Experimenter's Table, the experimenter asked the subject to slip the velcro fasteners (attached to the skin conductance monitor) onto the subject's first and second fingertips. The experimenter then read aloud the cover story from the sheet on the Experimenter's Desk.

Since only one letter (A-E) was assigned to a particular box (1-6), it was possible to prearrange the order in which the subject approached different poles, and hence, manipulate the distance between the subject and the assistant. In the Reduce reinforcement condition, subjects were reinforced for standing near the assistant (minimum 25 cm and see Figure 2). In the Expand reinforcement condition, subjects were reinforced for standing farther from the assistant (maximum 165 cm and see Figure 2). The subject was not informed that only one letter appeared in each of the target boxes, so the subjects experienced the target locations as if they had been randomly selected.

Once the subject approached a pole, the experimenter waited for 2 seconds to permit the skin conductance reading to stabilize, and then recorded the digital reading indicated on the skin conductance monitor. Whenever the subject approached and stood in front of a pole the assistant always turned her body towards the subject so that no matter where the subject was, the assistant was always directly facing that direction and looking over the subject's shoulder.

The experimenter then asked the subject to look at the Likert scale questions on the front wall (located just behind the research assistant) and to indicate a response for each of the four Likert scales. The subject's response to each Likert question was recorded by the experimenter and was taken to determine how the subjects felt as they stood at different distances from the assistant.

For every target pole approach, a second skin conductance measurement was recorded by the experimenter two seconds after the subject answered the third Likert scale question (nervous-calm). A third skin conductance measurement was then recorded two seconds after the subject answered the fourth Likert scale question (embarrassed-self assured). Skin conductance measurements were not taken after the first and second Likert questions as the variation in skin conductance (caused by the subject's physical exertion to move to the new location) may have confounded the skin conductance readings for those questions. It was felt that the delay (approximately 10 seconds) until the third and fourth Likert questions provided time for the effects of moving to subside.

After answering the fourth Likert question, the subject was asked to select one of the file cards from the pole box, read aloud the letters written on it, and return it to the box it came from. Once the subject had indicated the letters on the card, the experimenter indicated a point value (supposedly corresponding to that particular letter combination). In reality, these cards were

part of the cover story and allowed the experimenter to provide a predetermined reinforcement after the subject approached a pole (i.e., a specified distance from the assistant), and selected a card from the box. The reinforcement schedule determined the allocation of points and this schedule was based exclusively on (1) which experimental condition the subject was in and (2) which pole the subject was standing in front of. Asking subjects to select lettered cards gave an impression of randomness to the allocation of points they received at any of the poles.

The experimenter then asked the subject to return to the table, select a slip of paper from box number 2, and follow the same set of instructions as in the first search process (i.e., approach a pole, provide Likert ratings, and choose a card for point allocation). Each subject repeated these same steps until all six boxes (1-6) had been used.

The experimenter then asked the subject to disconnect the velcro-finger fasteners and to go back down the corridor to the assistant (who was again situated at position A1) for further instructions. Once the subject stopped approaching, the assistant mentally noted the **Second** distance and told the subject the following cover story: "You happen to be in the experimental condition that requires you to go through a second set of search trials. Please go back over to the experimenter for some more instructions". The assistant then recorded the Second distance measurement on the record sheet.

While the subject was preoccupied with the assistant, the experimenter switched the original 7 target boxes with the other 7 target boxes on the table. As a result, the subject would select slips of paper from these new boxes and consequently follow the compensating predetermined schedule of pole approaches.

The second set of trials consisted of the subjects going through nearly the same routine. All subjects received the identical amount of points in the same order as before but, the distances from the assistant were reversed so that those initially reinforced at small distances were now reinforced at large distances, and those initially reinforced at large distances were now reinforced at small distances. This reversal was designed to cancel out any effects of the initial reinforcements on interpersonal distance, thereby leaving the subjects with the same interpersonal distance preferences with which they entered the study.

After using up all the other six boxes, the subject was asked by the experimenter to return to the assistant (again situated at position A1) for further instructions. Once the subject stopped approaching the assistant, the Third distance preference was recorded and the assistant collected demographic information from the subject. Subjects were then asked by the experimenter what they thought the experiment was all about, to see if anyone had guessed the true nature of the experiment. None had. The experimenter then gave a lottery ticket to the subject for

participating in the experiment, debriefed the subject regarding the true purpose of the experiment, and asked the subject to refrain from disclosing any information about the study to other students until after the completion of the study.

Control Groups

The two control groups used for the experiment were as follows:

(1) The first control group of subjects followed the same procedure and schedule as the experimental groups; however, they were not told how many points they were earning during the experiment (see Figure 3). Hence, these control subjects did not receive any reinforcement for the duration of the experiment.

(2) The second control group of subjects followed the same procedure and schedule as the experimental groups; however, they were given point allocations that similarly reinforced both small and large distances. (See Figure 4). This was done to determine if there was a reinforcing effect from receiving **any** points on subjects' interpersonal distance preferences.

The first assistant processed all the subjects in the experimental groups and the first control group, while the second assistant worked only with the subjects in this second control group. Hence, there are three confounded explanations for differences between the two control groups: 1) differences between assistant 1 or 2, 2) receiving points or receiving no points, and

3) the first control group experiencing more ambiguity by not receiving any points.

Subjects for the two control groups were not randomly assigned. Subjects for the first control group were run through the experiment after all the subjects in the experimental conditions were completed. Since the conditions for the second control group were conceived of as an after-thought, these subjects were run through the experiment in succession at the very end of all the trials.

Figure 3

First Control Group Reinforcement Schedule

(a) Reinforcement schedule for the reduce segment of the First Reduce Then Expand group (i.e., initial interpersonal distance preference >60 cm).

Reinforcement Schedule ---------> Start: C = NPA
(Location and Points Allocated) 2nd D = NPA
3rd B = NPA
4th A = NPA
5th A = NPA
6th A = NPA

NPA = No Points Assigned.

(b) Reinforcement schedule for the expand segment of the First Reduce Then Expand group.

Reinforcement Schedule ---------> Start: C = NPA
(Location and Points Allocated) 2nd B = NPA
3rd D = NPA
4th E = NPA
5th E = NPA
6th E = NPA

(c) Reinforcement schedule for the expand segment of the First Expand Then Reduce group (i.e., initial interpersonal distance preference <60 cm).

Reinforcement Schedule ---------> Start: C = NPA
(Location and Points Allocated) 2nd B = NPA
3rd D = NPA
4th E = NPA
5th E = NPA
6th E = NPA

(d) Reinforcement schedule for the reduce segment of the First Expand Then Reduce group.

Reinforcement Schedule ---------> Start: C = NPA
(Location and Points Allocated) 2nd D = NPA
3rd B = NPA
4th A = NPA
5th A = NPA
6th A = NPA

Figure 4

Second Control Group Reinforcement Schedule

(a) Reinforcement schedule for the reduce segment of the First Reduce Then Expand group (i.e., initial interpersonal distance preference >60 cm).

Reinforcement Schedule ---------> Start: C = 4000 points
(Location and Points Allocated) 2nd D = 5000 points
3rd B = 4000 points
4th A = 5000 points
5th A = 4000 points
6th A = 5000 points

(b) Reinforcement schedule for the expand segment of the First Reduce Then Expand group.

Reinforcement Schedule ---------> Start: C = 4000 points
(Location and Points Allocated) 2nd B = 5000 points
3rd D = 4000 points
4th E = 5000 points
5th E = 4000 points
6th E = 5000 points

(c) Reinforcement schedule for the expand segment of the First Expand Then Reduce group (i.e., initial interpersonal distance preference <60 cm).

Reinforcement Schedule ---------> Start: C = 4000 points
(Location and Points Allocated) 2nd B = 5000 points
3rd D = 4000 points
4th E = 5000 points
5th E = 4000 points
6th E = 5000 points

(d) Reinforcement schedule for the reduce segment of the First Expand Then Reduce group.

Reinforcement Schedule ---------> Start: C = 4000 points
(Location and Points Allocated) 2nd D = 5000 points
3rd B = 4000 points
4th A = 5000 points
5th A = 4000 points
6th A = 5000 points

RESULTS

The data collected in the experiment was key-punched and verified by a professional keypuncher. All data were analyzed using a mainframe version of SPSS.

Means

The subjects stopped, on average, 61.3 cm from the assistant for the First distance approach. The 60 cm mean estimated for First distances was close to one found (61.3 cm), hence, the estimate was a good choice for splitting the subjects into two equal groups[2]. Subjects in the Reduce-Then-Expand group stopped, on average, 74.4 cm from the assistant for the First distance approach and 55.3 cm for the Second distance approach. Subjects in the Expand-Then-Reduce group stopped, on average, 51.1 cm for the First distance approach and 42.9 cm for the Second distance approach (see Table 1). From these results, the reinforcements seem successful for reducing distance preferences, but not for increasing them.

For the Third distance measurements, subjects in the Reduce-Then-Expand group stopped, on average, 58.7 cm from the assistant compared to 40.8 cm for the subjects in the Expand-Then-Reduce

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[2] Actually, these distances are slightly (8 or so cm) larger than those reported in Hayduk's (1981) study, because he used a toe-to-body centre distance rather than a toe-to-toe distance.

Table 1

MEANS OF THE DISTANCES AND OTHER MEASURES BY GROUP

	ALL GROUPS N=57		REDUCE THEN EXPAND GRP. N=16		EXPAND THEN REDUCE GRP. N=15		1ST CONTROL GROUP N=13		2ND CONTROL GROUP N=13	
VARIABLES	MEAN	STD. DEV	MEAN	STD. DEV	MEAN	STD. DEV	MEAN	STD. DEV	MEAN	STD. DEV
DISTANCE 1	61.3	19.8	74.4	18.1	51.1	7.9	65.6	21.3	52.8	20.7
DISTANCE 2	51.5	16.7	55.3	18.6	42.9	12.5	61.4	18.8	47.1	9.6
DISTANCE 3	51.1	16.1	58.7	16.6	40.8	13.0	58.9	16.2	45.6	9.9
GENDER	1.6	.5	1.6	.5	1.7	.5	1.5	.5	1.5	.5
AGE	20.7	4.7	20.1	4.0	21.0	5.8	19.5	1.1	22.3	6.2
HEIGHT	67.5	4.1	67.9	3.0	65.8	5.5	68.4	3.4	68.2	4.0
WEIGHT	144.6	26.9	142.3	27.5	131.1	23.4	156.2	29.3	151.3	22.7
SC BASELINE	71.3	51.8	70.9	42.0	65.1	47.8	82.9	71.7	67.1	47.8

SC = SKIN CONDUCTANCE

group. Basically, the reinforcements seem successful for both reducing and expanding distance preferences from the Second to the Third distance measurements.

These results are somewhat deceiving however, as we will come to slightly different conclusions when we do regression analyses which enter various types of control variables.

Correlations

Skin Conductance

The measurements for skin conductance were indexed "1" through "12" according to when skin conductance measurements were taken from the subject. The large N (684) is a result of multiplying 57 subjects by the 12 times their skin conductance was recorded for one of the three measures (Highest SC, Calm question SC or Assured question SC).

All the skin conductance measurements correlated highly with each other (see Table 2). As skin conductance increased for any one of the measures, a similar increase was maintained in the other two skin conductance measures. Indeed, the correlations are so high that there is little to distinguish between the measures of skin conductance; hence, we chose to use only one of the skin conductance measures (calm SC 1), as the measure for skin conductance for the remainder of the data analyses.

Table 2

CORRELATIONS BETWEEN SKIN CONDUCTANCE MEASURES

ALL GROUPS N=684			
	HIGHEST SC	CALM SC	ASSURED SC
HIGHEST SC	1.000		
CALM SC	.996***	1.000	
ASSURED SC	.995***	.999***	1.000

* P< .05
** P< .01
*** P< .001

Table 3

CORRELATIONS BETWEEN DISTANCE MEASURES

ALL GROUPS N=57			
	DISTANCE 1	DISTANCE 2	DISTANCE 3
DISTANCE 1	1.000		
DISTANCE 2	.571***	1.000	
DISTANCE 3	.493***	.779***	1.000

* P< .05
** P< .01
*** P< .001

Distance Measurements

The correlations among the three distance measures were also high (see Table 3). As the First distance measurements increased, the Second and Third distance measurements were proportionately

larger. These correlations are calculated for all the cases combined, and hence demonstrate that this consistency persisted despite any disruptions introduced by the experimental treatments. One implication of this, is that we must control for the variations in initial distance preferences in attempting to reach an assessment of the effects of the experimental treatments.

By treating these correlations as simple test-retest correlations of interpersonal distance preference, we have observed correlations that are slightly lower than the typical test-retest correlation of about .81 for studies using the stop-distance technique (Hayduk, 1983, p. 295). The correlations indicated in Table 3 are surprisingly strong however, given that our procedure is unobtrusive and hence that we were unable to control for as many factors as are controlled when making stop-distance measurements.

Likert items

The discussion of Likert items focuses on selecting which of these items should be used as control variables for the Distance 1 and Distance 2 regression analyses.

The four likert questions were indexed "1" through "12", according to which of the 12 times subjects were asked a particular question. Table 4 examines the correlations between each of the time 1 Likert items and their 11 subsequent measures. All four of the Likert scales displayed some stability over time, with 'assuredness' being the most stable of the Likert items. Though we

have no reason to pursue these correlations to determine what the decline in correlations is due to, we can at least conclude that the temporal stability in the Likert items shows that they are not just all error.

Table 4 **OVERTIME STABILITY IN THE 4 LIKERT ITEMS**

(CORRELATIONS)

ALL GROUPS				
	SECURE TIME 1	UNCOMFORTABLE TIME 1	CALM TIME 1	ASSURED TIME 1
TIME 1	1.000	1.000	1.000	1.000
TIME 2	.735***	.753***	.676***	.670***
TIME 3	.423**	.580***	.582***	.813***
TIME 4	.325**	.502***	.523***	.702***
TIME 5	.166	.393**	.269*	.680***
TIME 6	.093	.445***	.328**	.614***
TIME 7	.310**	.345**	.470***	.611***
TIME 8	.279*	.290*	.399**	.625***
TIME 9	.311**	.315**	.435***	.638***
TIME 10	.252*	.278*	.367**	.470***
TIME 11	.322**	.234*	.371**	.332**
TIME 12	.327**	.189	.382**	.544***

* P< .05
** P< .01
*** P< .001

N=57

Breaking the results down by group shows that subjects in the Reduce-Then-Expand group displayed the least stability (Table 5).

Table 5

OVERTIME STABILITY IN THE 4 LIKERT ITEMS BY GROUP

(CORRELATIONS)

	REDUCE THEN EXPAND GROUP N=16				EXPAND THEN REDUCE GROUP N=15			
	SECURE TIME 1	UNCMFRT TIME 1	CALM TIME 1	ASSURED TIME 1	SECURE TIME 1	UNCMFRT TIME 1	CALM TIME 1	ASSURED TIME 1
TIME 1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
TIME 2	.647**	.854***	.730**	.845***	.741**	.449*	.660**	.574*
TIME 3	.094	.426	.367	.801***	.453*	.559*	.734**	.892***
TIME 4	.034	.297	.430*	.566*	.393	.389	.599**	.800***
TIME 5	-.097	.207	.222	.619**	.060	.355	.506*	.718**
TIME 6	-.139	.287	.316	.388	-.096	.267	.556*	.834***
TIME 7	.196	.142	.077	.179	.420	.359	.442*	.742**
TIME 8	-.100	-.056	-.029	.162	.355	.171	.524*	.820***
TIME 9	-.203	.469*	.372	.288	.435	.162	.490*	.767***
TIME 10	-.224	-.135	.105	.110	.430	.139	.422	.402
TIME 11	.000	.157	-.153	.336	.452*	.051	.451*	.188
TIME 12	.143	.159	-.025	.231	.369	.063	.456*	.650**

* P< .05
** P< .01
*** P< .001

Table 5 - Continued

OVERTIME STABILITY IN THE 4 LIKERT ITEMS BY GROUP

(CORRELATIONS)

	1ST CONTROL GROUP N=13				2ND CONTROL GROUP N=13			
	SECURE TIME 1	UNCMFRT TIME 1	CALM TIME 1	ASSURED TIME 1	SECURE TIME 1	UNCMFRT TIME 1	CALM TIME 1	ASSURED TIME 1
TIME 1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
TIME 2	.649**	.707**	.765**	.627*	.906***	.916***	.796**	.762**
TIME 3	.551*	.476	.622*	.779**	.864***	.903***	.719**	.855***
TIME 4	.318	.529*	.502*	.687**	.863***	.859***	.799**	.817***
TIME 5	.077	.155	.408	.731**	.846***	.876***	-.082	.751**
TIME 6	.061	.317	.397	.680**	.585*	.937***	.145	.738**
TIME 7	.081	.484*	.653**	.711**	.638**	.528*	.568*	.804***
TIME 8	.254	.402	.582*	.538*	.576*	.664**	.494*	.866***
TIME 9	.318	.191	.711**	.597*	.326	.448	.458	.800**
TIME 10	.116	.564*	.599*	.543*	.153	.642**	.648**	.887***
TIME 11	.271	.421	.539*	.521*	.137	.591*	.537*	.883***
TIME 12	.274	.626*	.559*	.567*	.271	.330	.704**	.673**

* P< .05
** P< .01
*** P< .001

Subjects in the second control group displayed the largest number of overall significant correlations, though the reduced N makes some reasonably large correlations appear as insignificant. Table 6 shows the correlations among the four Likert items at time 1 and time 7 respectively. Times 1 and 7 were chosen since they both occurred when the subject was at a neutral distance (target pole C location) from the assistant. The time 7 correlations are generally slightly larger than the time 1 correlations, so the items have become more consistent over the course of the experiment. That is, the subjects initially rated the questions somewhat more independently than they did later on. Of the four Likert items - secure, uncomfortable, calm, and assured - uncomfortable and calm are highly correlated to the other Likert items. When we combine this with the fact that an assessment of discomfort is the cue used for the frequently used stop-distance measure of spatial preference, we can resolve to use the uncomfortable rating as a control variable in the regression analysis to which we will turn shortly.

Distance Measures with Demographics and Likert items.

The lower portion of Table 7 convinces us that the Likert items are generally uncorrelated with the subject's distance preferences, but this is with all groups combined. This makes us suspect that the Likert items will in fact be ineffective predictors in regression equations having any of these distances as dependent variables, but

Table 6

CORRELATIONS BETWEEN LIKERT SCALES BY GROUP

(TIME 1)

	REDUCE THEN EXPAND GROUP N=16			
TIME 1	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.673**	1.000		
CALM	.375	-.506*	1.000	
ASSURED	.257	-.173	.591**	1.000

	EXPAND THEN REDUCE GROUP N=15			
TIME 1	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.619**	1.000		
CALM	.507*	-.345	1.000	
ASSURED	.161	-.233	.475*	1.000

	1ST CONTROL GROUP N=13			
TIME 1	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.692**	1.000		
CALM	.528*	-.596*	1.000	
ASSURED	.319	-.407	.779**	1.000

	2ND CONTROL GROUP N=13			
TIME 1	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.654**	1.000		
CALM	.735**	-.236	1.000	
ASSURED	.779**	-.525*	.612*	1.000

* P< .05
** P< .01
*** P< .001

TABLE 6 - Continued

CORRELATIONS BETWEEN LIKERT SCALES BY GROUP

(TIME 7)

	REDUCE THEN EXPAND GROUP N=13			
TIME 7	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.955***	1.000		
CALM	.665**	-.689**	1.000	
ASSURED	.714**	-.636**	.824***	1.000

	EXPAND THEN REDUCE GROUP N=13			
TIME 7	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.909***	1.000		
CALM	.899***	-.876***	1.000	
ASSURED	.891***	-.825***	.914***	1.000

	1ST CONTROL GROUP N=13			
TIME 7	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.808***	1.000		
CALM	.212	-.576*	1.000	
ASSURED	.746**	-.790**	.572*	1.000

	2ND CONTROL GROUP N=13			
TIME 7	SECURE	UNCOMFORTABLE	CALM	ASSURED
SECURE	1.000			
UNCOMFORTABLE	-.640**	1.000		
CALM	.690**	-.488*	1.000	
ASSURED	.656**	-.543*	.835***	1.000

* P< .05
** P< .01
*** P< .001

we can not guarantee this since this table does not incorporate any effect of any of the experimental treatments, or control variables.

In Table 7, the overall correlations indicate that height was positively related to First distance with taller subjects preferring slightly larger First distances. Again, though we intend to use these demographic variables as controls in the planned regressions, the correlations suggest that these variables will generally prove to be ineffective, and unnecessary as controls.

TABLE 7

CORRELATIONS BETWEEN DISTANCE MEASURES AND OTHER VARIABLES

	ALL GROUPS N=57		
	DISTANCE 1	DISTANCE 2	DISTANCE 3
GENDER	-.182	-.168	-.131
AGE	-.119	-.039	-.146
HEIGHT	.243*	.170	.218
WEIGHT	.025	.046	.036
CALM SC TIME 1	-.076	-.102	.025
SECURE TIME 1	-.194	-.003	.138
UNCOMFORTABLE TIME 1	.084	.022	-.071
CALM TIME 1	-.170	-.135	-.067
ASSURED TIME 1	-.123	.011	.008

* P< .05
** P< .01
*** P< .001

Regression analyses

Three dummy variables were created to permit analysis of the data via regression. The dummy variable 'Reduce-Then-Expand' was created by assigning all the subjects in this experimental group a value of "1", while all the other subjects were assigned a value of zero. The dummy variable Expand-Then-Reduce was created by assigning a value of "1" to all subjects in the Expand-Then-Reduce experimental group and a zero to everyone else. The third dummy variable was scored "1" for subjects in the control group which received no point allocations (control group 1) and zero for everyone else. When all three of these dummy variables are entered into a regression the implicit comparison group is composed of those subjects who were never coded "1" into any of these three dummy variables, namely the subjects in the 2nd control group which received point allocations, but with the points distributed in a way which did not selectively reinforce either smaller or larger distance maintenances. Hence, the slopes associated with the dummy variables compare each of the designated groups to the second control group. Significant slopes for the Reduce-Then-Expand and the Expand-Then-Reduce dummy variables would indicate significant differences in distance preferences that were the result of the reinforcements administered during the experiment.

The dependent variables of interest are the Second and Third distance measurements, since these are the distances observed immediately after the various reinforcement administrations.

Numerous studies have demonstrated that there is considerable stability in distance preferences (Hayduk, 1983, 1985) so we planned to use the subject's distance preference just prior to reinforcement as a control variable in the regressions. When the Second distance preference is the dependent variable, the First distance preference is used as a control. When the Third distance preference is the dependent variable, the Second distance preference is used as a control since these preferences reflect the subjects' preferences just prior to the reinforcements which were designed to influence the Third distance measurements.

A short and a long regression equation were calculated for the regressions in which both the Second and Third distances are the dependent variables. The short regressions just enter the immediately prior distance preference and the three dummy variables as predictors. These regressions assess the effect of the reinforcement conditions controlling only for the subjects' immediately prior distance preferences. The long form of the regressions add several additional predictor variables to the list of predictors used in the short regressions. This introduces a statistical controlling for the effects of these other variables, and hence permits an assessment of the effectiveness of the experimental reinforcement conditions uncontaminated by the potentially confounded effects of these other variables. The extra control variables that were entered include gender, age, height, weight, skin conductance at the first 'calm' Likert question (calm

SC time 1), and subjects report of their comfort-discomfort just prior to the first reinforcement (uncomfortable time 1). These regressions are reported in Table 8.

Regression Analysis for Second Distance

The only statistically significant predictor of the Second distance preferences was the subject's First distance preference ($b = .452$, $p < .001$), see Table 8. The First distance preference accounts for about 28.6% of the variance, which is calculated by $.452^2$(variance of First distance)/(variance of the Second distance) [see Hayduk (1987): Equation 1.26 or 1.28], which is the bulk of the overall Adjusted R^2 of .352. The positive slope indicates that for every additional 1 cm in initial preferred distance, there was a corresponding .452 cm contribution to the Second distance preference. Or, nearly half of the subjects' initial distance preferences persisted to the Second distant measurement.

As anticipated, the slope for the Reduce-Then-Expand treatment group was negative (-1.627), indicating that the Second distance preferences for the subjects receiving this treatment were, on average, about 1.6 cm smaller than those for individuals with comparable intitial distances in the second control group, but this decline was too small to be statistically significant. The slope for the Expand-Then-Reduce group (-3.440) is also statistically insignificant, but is opposite to the expansion that would have been observed if the expand reinforcement would have been effective.

Table 8

REGRESSION ANALYSES FOR DISTANCES 2 & 3

	Predictor Variables											
DEPEND VARS and ("a")	DIST 1	DIST 2	REDUCE EXPAND GROUP	EXPAND REDUCE GROUP	1ST CONTRL GROUP	GENDER	AGE	HEIGHT	WEIGHT	CALM SC TIME 1	UNCMFO RTABLE TIME 1	ADJ. R SQ.
DIST 2 (23.2)	.452***		-1.627	-3.440	8.532							.352
DIST 2 (46.7)	.408***		-.798	-4.127	10.47*	-6.286	.200	-.014	-.085	-.031	.072	.302
DIST 3 (13.8)		.676***	7.550*	-1.971	3.640							.630
DIST 3 (-20.)		.691***	6.701*	-3.130	1.972	4.193	-.302	.604	-.032	.029	-1.725	.637

* P< .05
** P< .01
*** P< .001

- ("a" = INTERCEPT)
- One Tailed Test For The First Five Predictors

N=57

To get a better view of these results we plotted this regression in a data cube (see Figure 5). The following calculations parallel the calculations done in locating the predicted Second distances (D_2) (that is, how high the various groups are located within the cube), but use the means of the appropriate group's initial distances to show how the regressions correspond to the means from Table 1.

1.1 Short Equation for the Reduce Then Expand Group

$$\hat{D}_2 = 23.21 + .452(\mathbf{D_1}) - 1.627(\mathbf{DRE}) - 3.44(\mathbf{DER}) + 8.532(\mathbf{D1C})$$

$$\hat{D}_2 = 23.21 + .452(\mathbf{74.4}) - 1.627(\mathbf{1}) - 3.44(\mathbf{0}) + 8.532(\mathbf{0})$$

$$\hat{D}_2 = \mathbf{55.3}$$

D_1 = mean for initial distance preferences

$\hat{D}_2$ = predicted mean for Second distance preferences

DRE = dummy variable Reduce-Then-Expand

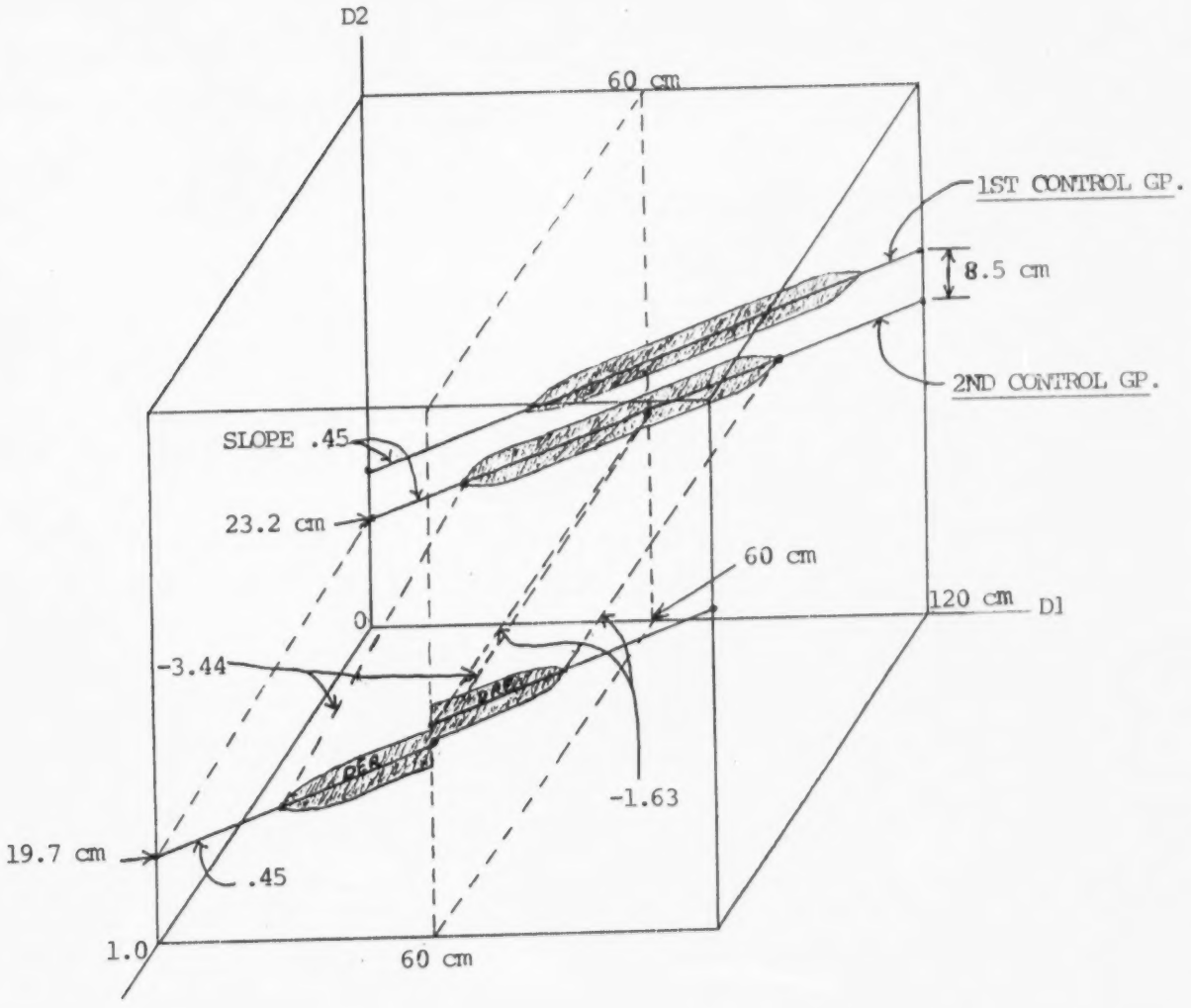
DER = dummy variable Expand-Then-Reduce

D1C = dummy variable for the first control group

Summing up the product of each value in equation 1.1 provides the expected value for the average second distance preferences for individuals in the Reduce-Then-Expand group. The results of the equation are consistent with the means from Table 1, as the mean First distance preference is 74.4 cm (D_1) and the calculated value for the Second distance mean (D_2) is 55.3 cm.

Figure 5

Cube Diagram for Distances 1 and 2



1.2 Short Equation for the Expand Then Reduce Group

$$\hat{D}_2 = 23.21 + .452(D_1) - 1.627(\mathbf{DRE}) - 3.44(\mathbf{DER}) + 8.532(\mathbf{D1C})$$

$$\hat{D}_2 = 23.21 + .452(\mathbf{51.1}) - 1.627(\mathbf{0}) - 3.44(\mathbf{1}) + 8.532(\mathbf{0})$$

$$\hat{D}_2 = \mathbf{42.9}$$

Contrary to our expectation that the Expand-Then-Reduce treatment group would display an expansion of preferred distance at the second observation, these subjects also displayed a reduction in their preferred distances (-3.440 cm), though this was also too small a change to be significant.

1.3 Short Equation for the 1ST Control Group

$$\hat{D}_2 = 23.21 + .452(D_1) - 1.627(\mathbf{DRE}) - 3.44(\mathbf{DER}) + 8.532(\mathbf{D1C})$$

$$\hat{D}_2 = 23.21 + .452(\mathbf{65.6}) - 1.627(\mathbf{0}) - 3.44(\mathbf{0}) + 8.532(\mathbf{1})$$

$$\hat{D}_2 = \mathbf{61.4}$$

The Second distance preferences of individuals in the first control group were on average 8.5 cm larger than the Second distance preferences of individuals with comparable initial distance preferences in the other control group. This difference is not significant, though it is very close. Note that the 8.5 cm difference does not correspond to the mean difference between the two control groups reported in Table 1 because there is no controlling for prior distance or initial distance in Table 1.

By controlling for all the variables in the long regression,

the difference between the two control groups increases to about 10.5 cm, which is significant at the .05 level if we adopt a one-tailed test. This says that something about the absence of point allocation feedback, perhaps the uncertainty created by repeated unevaluated exchanges, resulted in preferences for larger Second distances. We could not find any reasonable interpretation for why this could be due to the characteristics of the 2nd experimental assistant. Controlling for D_1 controls for initial response differences to this assistant, and hence any connection to D_2 requires a delayed effect type argument which seems unreasonable.

Regression Analysis with More Control Variables

The slopes for gender, age, height, weight, calm SC 1, and uncomfortable 1 indicate that these are not statistically significant predictors of Second distance preferences, and since we observe essentially the same pattern for the experimental treatment groups, no further comment seems necessary.

Regression Analysis for Third Distance

Still using Table 8, we can see that the strongest predictor of Third distance preferences was the subjects' Second distance preferences ($b = .676$, $p < .001$). The Second distance preference accounts for about 49% of the variance, which is most of the overall Adjusted R^2 of .630. The positive slope indicates that for every additional 1 cm in Second preferred distance, there was a

corresponding .676 cm contribution to the Third distance preference. That is, about two-thirds of the subjects' Second distance preferences persisted to the Third distance measurement.

As we hypothesized, the reduce-expand treatment group was a statistically significant predictor of Third distance preferences ($b = 7.55$, $p < .05$), accounting for about 4% of the variance. The positive slope indicates that the Third distance preferences for subjects receiving the expand treatment were, on average, about 7.5 cm larger than those for comparable individuals in the second control group.

As expected, the expand-reduce treatment group displayed a reduction of preferred distance at the Third observation (-1.971). The negative slope indicates that subjects in this treatment group displayed Third distance preferences, on average, about 1.9 cm smaller than those for comparable individuals in the second control group, but this decline was too small to be statistically significant.

The Third distance preferences of individuals in the first control group were on avereage 3.6 cm larger than the Third distance preferences of individuals with comparable Second distance preferences in the other control group, though this was also too small a difference to be statistically significant.

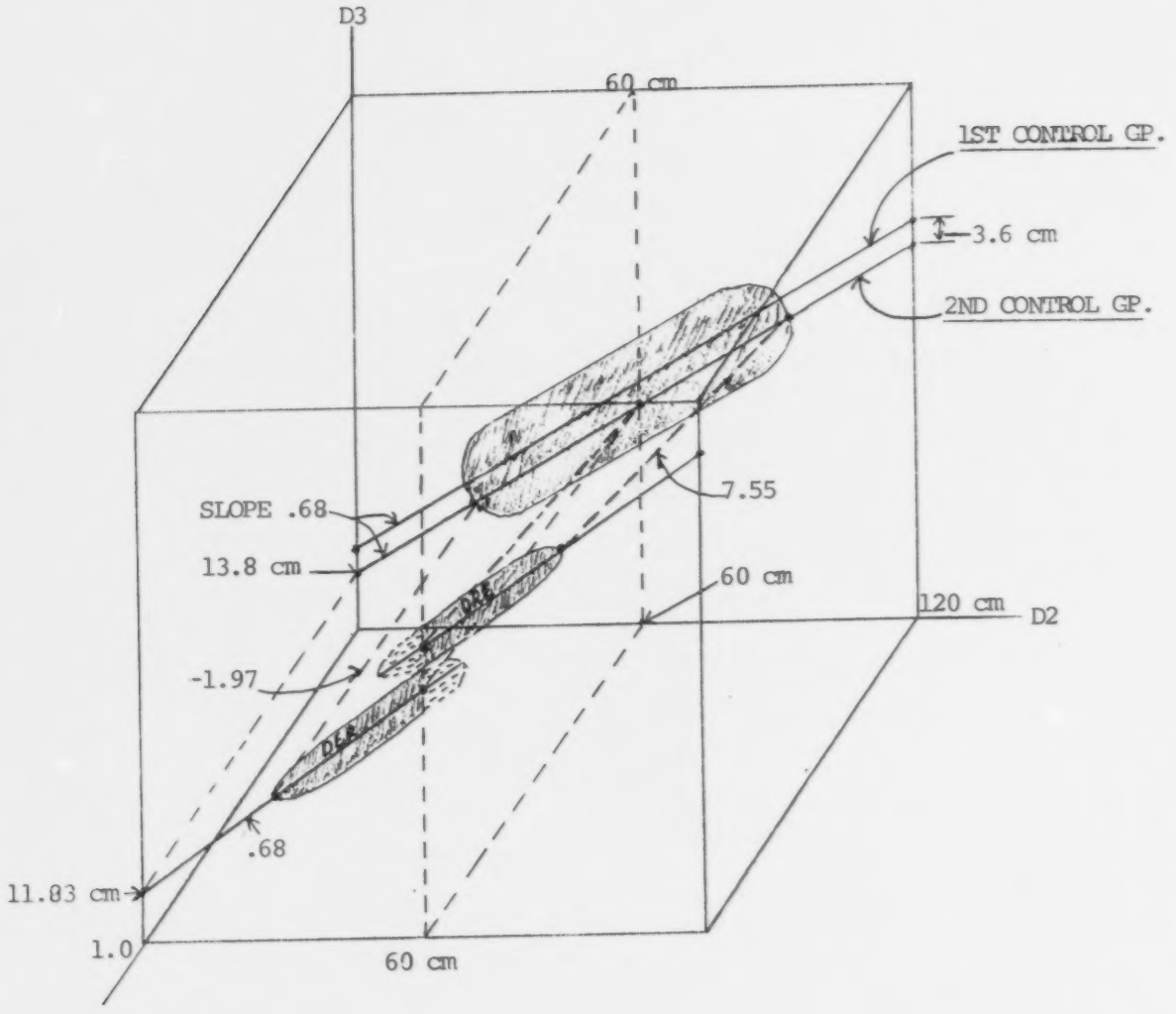
The slopes for gender, age, height, weight, calm SC 1, and uncomfortable 1 indicate that these variables are not statistically significant predictors for Third distance preferences.

See Figure 6 for a three-dimensional representation of the short regression with Third distance as the dependent variable. Note that the shading depicts the placement of individual cases in the various groups in Figures 5 and 6, and under-states the degree of variability in the subjects' First, Second and Third distances.

Depicting the true degree of variability in the dependent variables would have unnecessarily complicated these figures. A more realistic representation of the within group vertical spread of cases can be retained by taking the square root of the error variance from each of the regressions. For Figure 5 the square root of 180.7 is 13.4, and for Figure 6 the square root of 95.8 is 9.8. That is, roughly two-thirds of the cases should fall within this distance above and below the regression lines for the groups in these figures.

Figure 6

Cube Diagram for Distances 2 and 3



Regression Analysis for Likert Items

We have now seen that only one of the four potential treatment effects on distance preferences was in fact statistically demonstrable. This section presents an unplanned analysis which examines whether the subjects' feelings, at a particular distance, were altered by the reinforcers.

Recall that both the first and second reinforcement trials began with the subject approaching to a moderate distance of 95 cm, namely to location "C", and that the subjects report their feelings at this distance prior to receiving their point allocation. The question we now address is whether the reduce-first subjects became more comfortable or calm when they returned to this moderate distance as a result of receiving prior reinforcements for maintaining small distances, and whether the expand-first subjects became less comfortable or less calm as a result of having received prior reinforcements for maintaining large distances. Note that we can only examine the first treatment of the subjects in this fashion since no Likert scale measurements were made after completion of the second set of reinforcement trials.

The Likert scale scores at time-7 follow, and hence could be influenced by, the administration of one of the reinforcement schedules (expand or reduce, depending on which treatment group the subject is in) and are immediately prior to the beginning of the second reinforcement schedule. Thus, the Likert scores at time-7 could not be influenced by even the first of the point allocations for the second reinforcement schedule planned for that subject.

In all of the regressions using the time-7 Likert items as dependent variables, the strongest predictors were the time-1 measurements for the corresponding Likert items (see Table 9). This is indicative of the stability of the subjects' responses, and is of little interest, other than as a sign that these items behave consistently and hence are not all measurement error. Only one of the sixteen possible effects of the treatment groups is statistically significant.

On average, subjects in the expand-first treatment condition were more calm at time-7 than corresponding subjects in the second control group. That is, the positive slope indicates that subjects in the expand treatment condition measured .851 points higher (more calm), on the 7-point scale, than corresponding subjects in the control condition. This difference is not particularly trustworthy considering that 1 out of every 20 effects we examine are likely to be mere random sampling fluctuations if we use a .05 level of significance. Here we examine 16 possible effects and one is significant, hence we are nearly at what chance would predict. Furthermore, this difference is significant only if we control for all the variables in the long regression. Since none of these other predictors are significant, each could be dropped, and hence we should return to the short equation in which the slope is insignificant.

Overall, we must conclude that the reinforcements seem to have made no difference to the feelings of the subjects at the moderate distance from the subject.

Table 9

REGRESSION ANALYSIS FOR CALM TIME 7 & UNCOMFORTABLE TIME 7

	Predictor Variables											
DEPEND VARS and ("a")	CALM TIME 1	UNCOMF RTABLE TIME 1	REDUCE GROUP	EXPAND GROUP	1ST CNTRL GROUP	GENDER	AGE	HEIGHT	WEIGHT	CALM SC TIME 1	CALM SC TIME 7	ADJ. R SQ.
CALM TIME 7 (3.78)	.363***		.461	.617	.573							.218
CALM TIME 7 (-3.59)	.348***		.588	.851*	.617	.362	.033	.081	.002	.003	-.002	.218
UNCMFR TIME 7 (1.50)		.269*	-.091	-.080	-.497							.085
UNCMFR TIME 7 (4.67)		.281*	-.172	-.232	-.600	-.577	-.027	-.012	-.006	-.007	-.007	.034

* P< .05
** P< .01
*** P< .001

("a" = INTERCEPT)

N=57

Table 9 - Continued

REGRESSION ANALYSIS FOR SECURE TIME 7 & ASSURED TIME 7

	Predictor Variables											
DEPEND VARS and ("a")	SECURE TIME 1	ASSURD TIME 1	REDUCE GROUP	EXPAND GROUP	1ST CNTRL GROUP	GENDER	AGE	HEIGHT	WEIGHT	ASSURE SC TIME 1	ASSURE SC TIME 7	ADJ. R SQ.
SECURE TIME 7 (4.37)	.252**		.241	.433	.576							.147
SECURE TIME 7 (3.49)	.229*		.306	.529	.671	.054	.025	.001	.003	-.003	.003	.062
ASSURD TIME 7 (3.05)		.521***	.027	.037	.375							.346
ASSURD TIME 7 (-1.12)		.528***	.114	.269	.466	.393	.024	.030	.007	-.007	.007	.310

* P< .05
** P< .01
*** P< .001

("a" = INTERCEPT)

N=57

Regression Analysis for Skin Conductance

A similar analysis was attempted for skin conductance, to see if the reinforcements altered subjects' skin conductance as the subjects maintained a moderate distance from the assistant.

Using Table 10, the only statistically significant predictor of skin conductance at time-7 was the subjects' skin conductance at time-1 ($b = .984$, $p < .001$). The amount of skin conductance at time-1 accounted for most of the variance in later skin conductances. This again provides us with evidence that the skin conductance measurements are stable, but this is not the key issue.

The slopes for the reduce treatment condition, the expand condition, our 1st control group, gender, age, height, weight, calm SC time 1, and uncomfortable time-1 were not statistically significant predictors of skin conductance at time-7. Hence, again we have no evidence of any treatment effects, and the additional analysis has provided no new developments.

Table 10

REGRESSION ANALYSIS FOR SKIN CONDUCTANCE AT CALM QUESTION 7

	Predictor Variables									
DEPEND VARS and ("a")	CALM SC TIME 1	REDUCE GROUP	EXPAND GROUP	1ST CONTROL GROUP	GENDER	AGE	HEIGHT	WEIGHT	UNCOMFORTABLE TIME 1	ADJ. R SQ.
CALM SC TIME 7 (-2.09)	.984***	-3.757	-6.480	-8.350						.948
CALM SC TIME 7 (57.46)	1.001***	2.436	-8.750	-7.456	-6.562	.039	-.515	-.136	1.377	.947

* P< .05
** P< .01
*** P< .001

("a" = INTERCEPT)

Discussion

This study began as an attempt to examine the relationship between interpersonal distance preferences and positive reinforcement. We operationalized the study by systematically reinforcing individuals at small or large interpersonal distances, and subsequently measuring changes in their approach distances on another individual. The most fundamental analyses were the regressions in which the dependent variables were the second and third distances, and the independent variables were the reduce and expand treatment conditions. Overall, we found only one of the four relevant regression slopes to be significant. Subjects' interpersonal distance preferences were significantly expanded for the third distance measurements. The distance measurements for subjects in expand first condition and the two reduce conditions were not significantly different from the subjects in the control condition. While not as consistent as we would have preferred, these results indicate that positive reinforcement is capable of manipulating interpersonal distance preferences.

A possible explanation for why the reinforcers lacked effectiveness at first, may reside in the overwhelming initial amount of information confusing subjects about the value of the points awarded to them. Hence, the subjects may have been so overwhelmed or distracted that the strength of the points, as reinforcers, was lost for the first experimental trials. In the

second experimental trials, subjects were more aware of the value of the points (fewer distractions), allowing the reinforcement value of the points to emerge. In view of this, the differences between the first and second distance measurements seem invalid and the starting point for future research should begin with the differences between the second and third distance measurements. Future research should also include additional experimental trials (eg. third and fourth sequences) to determine whether the reinforcing strength of points is indeed diminished only in initial experimental trials and whether their reinforcing strength reemerges over time.

So far, we have only been able to demonstrate that while positive reinforcement is capable of expanding interpersonal distance preferences, we cannot claim to have demonstrated reinforcements can reduce interpersonal distance preferences. One possible explanation for this expand-only phenomena is that individuals with initially small (<60 cm) interpersonal distance preferences are not as susceptible to modification as are individuals with initially large (>60 cm) interpersonal distance preferences. The individuals in the Expand-Then-Reduce group initially displayed small interpersonal distance preferences and did not experience a significant change to their distance preferences for the duration of the experiment. Those subjects whose interpersonal distances expanded in response to the reinforcement had displayed initially large distance preferences,

which were supposed to be shrunk by a reduce condition (which in fact did not shrink), but which expanded when they encountered the reinforcements at large distances. The ineffectiveness of the initial reinforcement to expand initially small interpersonal distances allowed the small distance preferences to persist to the second set of reinforcers, which tried to reduce these distance preferences. The reinforcements used in the experiment were not strong enough to further shrink these distance preferences beyond their already small size.

In summary, the results are mixed for the predictions of reinforcement theory and the effects of positive reinforcement on interpersonal distance preferences. Positive reinforcement is capable of increasing the size of interpersonal distance preferences, but not for reducing them. Further research is needed to examine the possibilities that the strength of reinforcements varied over time, as well as the possibility that small interpersonal distance preferences are more resistant to change than are large distance preferences.

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APPENDIX A

COVER STORY AND LOTTERY EXPLANATION

The purpose of the experiment is to determine different styles of search procedures. The 10 poles labelled A through E correspond to the letters indicated upon the slips of paper in the boxes labelled 1 through 6. Beginning with box number 1, select a slip of paper, look at the letter indicated upon it (A through E), place the slip of paper in the box labelled "USED" and go stand directly in front of one of the poles that corresponds to that letter. After I have asked you a few questions about your feelings, you may select one of the cards from the pole box and tell me the letters indicated upon it. The letters indicated upon the cards correspond with points that are exchangeable for Western Express lottery tickets at the end of the experiment. Once you tell me the letters on the card, you may place it back in the pole box and come back to the table to select a slip of paper from box number 2, following the same procedure as before until all 6 boxes have been chosen from.

APPENDIX B

RECORD SHEET 1

ID._____

Corridor Approach

	Distance		
1.	_____ cm.	Start: Reduce	Expand
2.	_____ cm.		
3.	_____ cm.		

Sex: Male Female

Age: _____ years.

Height: _____ .

Weight: _____ lbs.

Question: What do you think this experiment was about?

_____

_____

_____.

APPENDIX C

Target Box Set-up

There were a total of 14 target boxes on the Experimenter's Table. The first set of 7 boxes (numbered 1-6 and "USED"), were made accessible to subjects in the Expand reinforcement condition. In each of these 6 target boxes, the slips of paper were labelled as follows:

Expand Distance Target Boxes

Box 1 = Cs only

Box 2 = Bs only

Box 3 = Ds only

Box 4 = Es only

Box 5 = Es only

Box 6 = Es only

The second set of 7 boxes (also numbered 1-6 and "USED"), were made accessible to subjects in the Reduce reinforcement condition. In each of these 6 target boxes, the slips of paper were labelled as follows:

Reduce Distance Target Boxes

Box 1 = Cs only

Box 2 = Ds only

Box 3 = Bs only

Box 4 = As only

Box 5 = As only

Box 6 = As only

APPENDIX D

RECORD SHEET 2

ID._____

Baseline GSR: _____

Start: Reduce Expand

Approach On Pole:	Highest GSR	L3	L4	L 1	L2	L3	I4
1.	_____	_____	_____	___	___	___	___
2.	_____	_____	_____	___	___	___	___
3.	_____	_____	_____	___	___	___	___
4.	_____	_____	_____	___	___	___	___
5.	_____	_____	_____	___	___	___	___
6.	_____	_____	_____	___	___	___	___
1.	_____	_____	_____	___	___	___	___
2.	_____	_____	_____	___	___	___	___
3.	_____	_____	_____	___	___	___	___
4.	_____	_____	_____	___	___	___	___
5.	_____	_____	_____	___	___	___	___
6.	_____	_____	_____	___	___	___	___

CODEBOOK

VAR	REC	COL	
VAR01	1	1- 2	SUBJECT IDENTIFICATION NUMBER (CODE ACTUAL NUMBER)
VAR02	1	3- 4	RECORD (CODE ACTUAL NUMBER)
VAR03	1	6- 8	FIRST DISTANCE (CODE ACTUAL CENTIMETERS)
VAR04	1	10-12	SECOND DISTANCE (CODE ACTUAL CENTIMETERS)
VAR05	1	14-16	THIRD DISTANCE (CODE ACTUAL CENTIMETERS)
VAR06	1	18	* REDUCE/EXPAND REINFORCEMENT 1 REDUCE 2 EXPAND
VAR07	1	20	GENDER 1 MALE 2 FEMALE
VAR08	1	22-23	AGE (CODE ACTUAL YEARS)
VAR09	1	25-27	HEIGHT (CODE ACTUAL INCHES)
VAR10	1	29-31	WEIGHT (CODE ACTUAL LBS.)
VAR11	1	34-36	** BASELINE GSR READING AT BEGINNING OF EXPERIMENT (CODE ACTUAL NUMBER INDICATED ON GSR MONITOR)
VAR12	1	38-40	* HIGHEST GSR READING FOR EACH POSITION ** (CODE ACTUAL NUMBER INDICATED ON GSR MONITOR)
VAR13	1	42-44	* GSR READING AFTER CALM QUESTION ASKED ** (CODE ACTUAL NUMBER INDICATED ON GSR MONITOR)
VAR14	1	46-48	* GSR READING AFTER ASSURED QUESTION ASKED ** (CODE ACTUAL NUMBER INDICATED ON GSR MONITOR)

VAR	REC	COL	
			THE FOLLOWING 4 QUESTIONS WERE ASKED IN THE SAME WAY:
			[ON A SCALE OF "1" THROUGH "7" WHERE "1" IS "THREATENED" AND "7" IS "SECURE", CAN YOU TELL ME HOW "THREATENED" THROUGH "SECURE" YOU FEEL?]
VAR15	1	50	* HOW THREATENED THROUGH SECURE DO YOU FEEL? 1 THREATENED 7 SECURE
VAR16	1	51	* HOW COMFORTABLE THROUGH UNCOMFORTABLE DO YOU FEEL? 1 COMFORTABLE 7 UNCOMFORTABLE
VAR17	1	52	* HOW NERVOUS THROUGH CALM DO YOU FEEL? 1 NERVOUS 7 CALM
VAR18	1	53	* HOW EMBARRASSED THROUGH SELF ASSURED DO YOU FEEL? 1 EMBARRASSED 7 SELF ASSURED
VAR19	1	55	CONTROL OR EXPERIMENTAL SUBJECTS *** 1 CONTROL GROUP #1 2 EXPERIMENTAL *** 3 CONTROL GROUP #2

[THERE ARE 12 RECORDS FOR EACH OF THE 44 CASES]

* COLUMN 18, AND COLUMNS 38 THROUGH 53 OF RECORDS 2 THROUGH 12 CONTAIN CORRESPONDING INFORMATION FOR EACH OF THE 11 ADDITIONAL EXPERIMENTAL APPROACHES.

[FOR THESE VARIABLES, RECORDS 2 THOUGH 12 ARE CODED THE SAME AS RECORD 1 IN EACH OF THE 44 CASES]

** THE GSR READINGS LOCATED IN COLUMNS 38 THROUGH 48 INDICATE THE MONITOR REGISTERED SKIN CONDUCTANCE IN MILLIAMPS. THE NUMBERS RECORDED HERE ARE IN MILLIAMPS X 10.0, SO THAT THE ACTUAL AMPERAGE IN MILLIAMPS CAN BE RETRIEVED BY DIVIDING THE REPORTED AMPERAGE BY 10.0

*** SUBJECTS IN CONTROL GROUP #1 WERE NOT TOLD HOW MANY POINTS THEY WERE EARNING DURING THE EXPERIMENT.

SUBJECTS IN CONTROL GROUP #3 WERE GIVEN ARBITRARY NUMBERS OF POINTS DURING THE EXPERIMENT.

DATA APPENDIX

```
12345678901234567890123456789012345678901234567890123456789012345

0101 045 030 045 1 2 19 063 110  090 128 116 120 6256 2
0102               1                144 140 128 6266
0103               1                154 142 143 6256
0104               1                151 146 149 6266
0105               1                162 152 158 6266
0106               1                180 168 156 6266
0107               2                120 128 138 6266
0108               2                143 139 145 6266
0109               2                140 143 147 6266
0110               2                165 158 163 6267
0111               2                159 153 150 6267
0112               2                146 149 150 6267
0201 050 030 045 1 2 18 068 150  098 098 100 101 3644 2
0202               1                116 124 120 4555
0203               1                122 127 127 5555
0204               1                161 149 136 5645
0205               1                171 156 148 6655
0206               1                178 152 152 5544
0207               2                097 098 097 5366
0208               2                150 161 170 6266
0209               2                150 146 134 6266
0210               2                169 181 178 6266
0211               2                183 186 189 6276
0212               2                186 181 171 6266
0301 080 057 045 1 1 18 071 185  140 199 175 164 3456 2
0302               1                165 160 154 5466
0303               1                180 176 172 4655
0304               1                190 189 181 2755
0305               1                180 162 160 3636
0306               1                171 166 166 4645
0307               2                161 170 171 6266
0308               2                178 169 169 5446
0309               2                184 178 173 6267
0310               2                200 178 178 7266
0311               2                228 213 198 6256
0312               2                248 224 211 5356
0401 115 075 065 1 2 21 065 120  094 080 082 082 4434 2
0402               1                089 091 093 4534
0403               1                100 105 102 5344
0404               1                097 098 098 4344
0405               1                109 110 111 5344
0406               1                113 112 108 5344
0407               2                071 062 060 5354
0408               2                073 080 080 5354
0409               2                086 081 080 5354
0410               2                090 094 089 5354
0411               2                102 104 102 5255
0412               2                103 102 103 5355
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12345678901234567890123456789012345678901234567890123456789012345

0501 065 055 042 2 1 19 071 125  092 096 087 090 2335 2
0502              2                  100 096 093 5435
0503              2                  096 096 096 6535
0504              2                  091 095 091 5544
0505              2                  094 091 092 6254
0506              2                  090 085 088 6455
0507              1                  060 061 061 4554
0508              1                  064 067 062 4346
0509              1                  068 069 064 3536
0510              1                  073 066 066 2626
0511              1                  070 068 067 2615
0512              1                  066 066 066 2715
0601 075 060 055 1 1 23 072 190  139 158 147 150 5635 2
0602              1                  186 154 147 6436
0603              1                  190 162 167 7266
0604              1                  184 164 160 7167
0605              1                  170 154 145 7177
0606              1                  169 169 163 7177
0607              2                  163 156 146 7177
0608              2                  159 148 146 7177
0609              2                  167 148 149 7667
0610              2                  176 159 158 7177
0611              2                  188 163 160 5267
0612              2                  186 165 161 6277
0701 061 055 057 1 1 20 072 165  042 048 047 043 6266 2
0702              1                  064 050 051 6266
0703              1                  065 058 056 6255
0704              1                  066 060 062 5256
0705              1                  073 067 072 6256
0706              1                  078 069 074 6266
0707              2                  050 048 047 5354
0708              2                  055 052 055 5256
0709              2                  062 061 063 5266
0710              2                  069 061 065 6266
0711              2                  071 071 072 6256
0712              2                  081 077 077 6266
0801 060 035 033 2 2 20 060 120  069 073 074 070 3347 2
0802              2                  073 068 067 3344
0803              2                  073 071 073 6667
0804              2                  069 071 068 7667
0805              2                  070 067 065 7577
0806              2                  069 065 067 7377
0807              1                  063 062 063 7177
0808              1                  070 071 068 7177
0809              1                  073 066 064 6277
0810              1                  076 070 067 6254
0811              1                  069 065 063 6362
0812              1                  065 064 063 7177
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12345678901234567890123456789012345678901234567890123456789012345

0901 059 050 060 2 1 18 074 145  179 250 253 249 4246 2
0902               2                270 262 250 3424
0903               2                279 279 262 6256
0904               2                271 277 264 6266
0905               2                269 264 263 6266
0906               2                267 262 264 6267
0907               1                269 260 255 5355
0908               1                260 252 251 6366
0909               1                282 279 273 3535
0910               1                281 279 277 2624
0911               1                284 280 281 1622
0912               1                261 253 251 2435
1001 055 045 050 2 1 20 072 155  109 113 110 113 3466 2
1002               2                114 110 109 5266
1003               2                111 113 116 7267
1004               2                116 114 113 7156
1005               2                110 112 110 7177
1006               2                106 104 105 7177
1007               1                097 103 099 7267
1008               1                101 101 099 7177
1009               1                100 100 100 7177
1010               1                105 101 101 7177
1011               1                104 101 101 7177
1012               1                106 104 105 7177
1101 075 042 045 1 2 18 066 135  044 045 035 039 5536 2
1102               1                046 046 045 4346
1103               1                052 048 050 3456
1104               1                052 049 047 3546
1105               1                052 047 047 2346
1106               1                050 047 048 5556
1107               2                047 045 045 6356
1108               2                050 047 048 3256
1109               2                048 040 040 5356
1110               2                039 039 038 7257
1111               2                040 041 040 7267
1112               2                046 039 039 7267
1201 040 032 038 2 2 22 056 089  019 029 030 029 6265 2
1202               2                040 035 040 5355
1203               2                037 033 038 6266
1204               2                042 039 041 7176
1205               2                045 044 046 6255
1206               2                045 043 045 6266
1207               1                025 022 025 5355
1208               1                032 037 031 5255
1209               1                037 045 039 4445
1210               1                049 041 040 3534
1211               1                041 049 045 3534
1212               1                047 046 043 3443
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12345678901234567890123456789012345678901234567890123456789012345

1301 060 050 045 2 2 18 063 125  100 102 101 100 4234 2
1302              2                  116 107 109 5255
1303              2                  122 118 110 5255
1304              2                  129 119 116 5255
1305              2                  117 112 111 6255
1306              2                  116 115 112 6256
1307              1                  091 087 084 5254
1308              1                  096 099 092 5425
1309              1                  100 097 092 5445
1310              1                  112 108 106 5255
1311              1                  110 106 105 4245
1312              1                  110 106 106 5345
1401 050 033 031 2 2 18 062 115  032 058 051 052 5333 2
1402              2                  057 055 054 4243
1403              2                  058 054 057 5433
1404              2                  062 063 064 5344
1405              2                  065 063 060 5355
1406              2                  066 060 059 5255
1407              1                  046 045 044 5443
1408              1                  049 050 051 4433
1409              1                  053 051 051 3433
1410              1                  060 057 058 3534
1411              1                  057 055 056 4334
1412              1                  061 058 058 5344
1501 057 032 028 2 2 18 067 125  032 039 040 041 7177 2
1502              2                  042 042 043 7177
1503              2                  041 042 040 7177
1504              2                  042 040 040 7177
1505              2                  042 041 040 7177
1506              2                  043 044 043 7177
1507              1                  030 030 031 7177
1508              1                  033 033 032 7177
1509              1                  035 035 036 7177
1510              1                  036 035 034 7177
1511              1                  036 035 035 7177
1512              1                  037 036 036 7177
1601 050 028 031 2 2 18 064 128  030 030 030 030 6265 2
1602              2                  036 035 035 6177
1603              2                  037 037 036 7177
1604              2                  038 037 037 7177
1605              2                  038 039 039 7177
1606              2                  039 039 039 7177
1607              1                  030 031 031 7177
1608              1                  034 034 034 7177
1609              1                  036 035 036 7177
1610              1                  040 039 039 7177
1611              1                  041 040 040 7177
1612              1                  041 041 041 7177
```

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12345678901234567890123456789012345678901234567890123456789012345

1701 045 035 028 2 2 31 066 114  030 028 028 027 7156 2
1702             2                045 042 039 7166
1703             2                043 042 041 7177
1704             2                045 043 042 7177
1705             2                043 040 040 7177
1706             2                047 042 042 7177
1707             1                020 020 020 7177
1708             1                024 023 023 7177
1709             1                025 024 023 7177
1710             1                025 025 024 7177
1711             1                024 024 024 7177
1712             1                026 026 024 7177
1801 075 032 060 1 2 18 068 150  129 133 128 136 6134 2
1802             1                126 131 124 7145
1803             1                129 126 124 4344
1804             1                141 138 138 2233
1805             1                133 142 133 3344
1806             1                134 136 139 4445
1807             2                110 112 114 7166
1808             2                116 113 115 7266
1809             2                118 110 118 7166
1810             2                117 118 114 7166
1811             2                114 110 109 7167
1812             2                122 115 118 7166
1901 045 035 032 2 2 18 062 120  015 018 018 017 5233 2
1902             2                024 023 022 6254
1903             2                024 024 024 5254
1904             2                029 028 026 5254
1905             2                028 029 029 6265
1906             2                030 031 030 6265
1907             1                013 012 012 6265
1908             1                014 011 012 6265
1909             1                016 017 018 6255
1910             1                017 014 016 5355
1911             1                021 020 022 5334
1912             1                023 020 020 5345
2001 061 033 028 1 2 18 067 120  054 050 046 040 5257 2
2002             1                052 052 049 6267
2003             1                056 055 055 6267
2004             1                060 056 055 6366
2005             1                064 061 060 6267
2006             1                063 063 061 7167
2007             2                034 033 032 6256
2008             2                040 041 040 6266
2009             2                045 045 045 7267
2010             2                048 048 048 7266
2011             2                051 052 051 7167
2012             2                050 049 048 7177
```

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12345678901234567890123456789012345678901234567890123456789012345

2101 105 085 090 1 1 18 071 180   098 101 098 099 5346 2
2102               1                 107 103 103 5246
2103               1                 098 094 090 4445
2104               1                 095 093 091 4345
2105               1                 094 093 092 4434
2106               1                 094 090 091 4344
2107               2                 099 102 101 4555
2108               2                 109 103 104 4445
2109               2                 099 099 100 5345
2110               2                 098 095 094 5345
2111               2                 096 094 093 5345
2112               2                 093 093 091 5355
2201 090 085 090 1 2 19 064 110   017 021 021 021 6266 2
2202               1                 024 023 023 6266
2203               1                 026 024 025 6266
2204               1                 027 024 023 5366
2205               1                 029 027 029 5366
2206               1                 032 030 028 5366
2207               2                 017 018 019 5366
2208               2                 022 021 020 5366
2209               2                 024 023 023 5366
2210               2                 027 026 025 6266
2211               2                 027 027 027 6266
2212               2                 029 030 029 6266
2301 067 062 061 1 1 21 070 150   064 061 062 064 3434 2
2302               1                 079 078 077 5454
2303               1                 079 078 078 6355
2304               1                 081 079 078 6266
2305               1                 081 082 083 6266
2306               1                 081 079 080 7266
2307               2                 062 067 069 6266
2308               2                 077 071 072 7166
2309               2                 078 073 072 7166
2310               2                 080 080 080 7177
2311               2                 090 084 084 7176
2312               2                 087 086 086 7177
2401 075 063 050 1 1 19 066 125   029 039 038 037 6356 2
2402               1                 044 043 042 6256
2403               1                 049 047 046 6266
2404               1                 055 052 051 6265
2405               1                 064 060 057 6255
2406               1                 057 056 055 5255
2407               2                 039 037 036 7177
2408               2                 048 045 047 6177
2409               2                 053 053 052 6266
2410               2                 059 058 057 6266
2411               2                 064 060 060 6266
2412               2                 064 062 064 7177
```

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12345678901234567890123456789012345678901234567890123456789012345

2501 045 075 075 2 2 18 063 120  039 051 052 051 7346 2
2502               2                064 064 062 7567
2503               2                065 064 064 7267
2504               2                068 070 069 6267
2505               2                072 073 072 5247
2506               2                073 073 073 4347
2507               1                048 048 048 6267
2508               1                049 047 048 6267
2509               1                051 049 048 6367
2510               1                058 058 055 6267
2511               1                059 061 060 6267
2512               1                066 065 064 6267
2601 080 073 063 1 2 34 065 125  023 026 024 024 5255 2
2602               1                028 026 026 6266
2603               1                028 027 027 6166
2604               1                031 028 028 7177
2605               1                031 031 030 7177
2606               1                032 030 032 7177
2607               2                017 018 019 7177
2608               2                022 021 021 7177
2609               2                022 022 023 7177
2610               2                025 025 026 7177
2611               2                027 027 027 7177
2612               2                029 028 029 7177
2701 040 045 034 2 2 38 062 135  026 027 026 026 7266 2
2702               2                031 028 030 7267
2703               2                033 033 033 7177
2704               2                033 033 033 7177
2705               2                034 034 033 7177
2706               2                035 037 036 7177
2707               1                020 022 022 7177
2708               1                024 024 024 7177
2709               1                027 027 026 7177
2710               1                029 028 027 7177
2711               1                031 030 030 7177
2712               1                030 030 030 7177
2801 062 045 075 1 1 18 071 155  046 055 050 052 6256 2
2802               1                059 058 056 6256
2803               1                059 058 060 6356
2804               1                059 058 063 5356
2805               1                065 065 065 5266
2806               1                070 065 066 5266
2807               2                066 069 068 6266
2808               2                083 075 079 5256
2809               2                076 073 072 6366
2810               2                095 093 095 6566
2811               2                095 093 092 6356
2812               2                100 096 097 6356
```

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12345678901234567890123456789012345678901234567890123456789012345

2901 075 057 065 1 2 19 067 107  028 028 030 030 6243 2
2902             1                  032 032 033 5225
2903             1                  036 036 035 3422
2904             1                  039 040 039 2623
2905             1                  042 040 041 1622
2906             1                  043 041 043 3445
2907             2                  043 044 046 6255
2908             2                  054 051 052 5266
2909             2                  053 054 053 5366
2910             2                  055 055 056 5266
2911             2                  060 059 059 6265
2912             2                  064 063 064 5366
3001 050 060 058 2 2 20 062 160  024 028 028 028 5426 1
3002             2                  029 029 029 5556
3003             2                  030 031 031 6266
3004             2                  031 030 030 6266
3005             2                  031 031 031 7256
3006             2                  031 031 031 6266
3007             1                  019 019 019 7226
3008             1                  022 022 022 6267
3009             1                  023 024 024 7166
3010             1                  025 025 026 6166
3011             1                  027 026 026 6126
3012             1                  028 027 027 6256
3101 105 090 065 2 2 18 069 132  028 034 030 028 5366 1
3102             2                  040 043 042 6276
3103             2                  046 046 046 7276
3104             2                  053 045 049 7177
3105             2                  056 050 053 7177
3106             2                  058 053 056 7177
3107             1                  036 037 038 7177
3108             1                  055 057 058 7277
3109             1                  061 061 058 7277
3110             1                  059 061 059 7276
3111             1                  072 074 073 7276
3112             1                  073 072 071 7276
3201 070 050 048 1 1 20 070 170  102 106 087 088 7266 1
3202             1                  100 101 101 7177
3203             1                  120 085 088 7265
3204             1                  114 105 105 6265
3205             1                  110 110 113 6355
3206             1                  117 113 112 5355
3207             2                  069 071 070 6266
3208             2                  075 070 073 6265
3209             2                  075 079 081 7276
3210             2                  081 082 084 7176
3211             2                  080 080 080 7276
3212             2                  082 087 088 7166
```

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12345678901234567890123456789012345678901234567890123456789012345

3301 105 050 060 1 1 19 072 160  090 091 088 087 5423 1
3302             1                086 088 087 5253
3303             1                091 092 090 5443
3304             1                095 095 093 3533
3305             1                097 097 098 4433
3306             1                100 099 101 4344
3307             2                080 083 081 5444
3308             2                086 090 090 4433
3309             2                089 092 092 5443
3310             2                094 095 095 5444
3311             2                097 097 097 5245
3312             2                099 099 099 5344
3401 070 105 100 1 1 20 072 154  077 084 083 081 6224 1
3402             1                088 089 087 7267
3403             1                089 084 086 6266
3404             1                096 093 091 7267
3405             1                094 088 088 7266
3406             1                090 087 088 7167
3407             2                079 076 078 7166
3408             2                081 078 081 7167
3409             2                081 083 080 7167
3410             2                084 083 082 7167
3411             2                084 085 086 7277
3412             2                091 093 090 7277
3501 062 058 058 1 1 20 074 200  079 100 090 090 6433 1
3502             1                098 094 090 6556
3503             1                090 086 084 6355
3504             1                097 099 096 5565
3505             1                113 104 101 5355
3506             1                111 100 100 5354
3507             2                058 062 060 6366
3508             2                067 064 063 6266
3509             2                070 069 068 6266
3510             2                076 082 081 7266
3511             2                083 080 078 7266
3512             2                083 088 088 7266
3601 040 045 045 2 1 21 067 165  296 294 291 292 7177 1
3602             2                330 312 311 7177
3603             2                314 304 296 7177
3604             2                310 305 310 7177
3605             2                321 314 313 7177
3606             2                333 332 323 7177
3607             1                299 301 300 7177
3608             1                305 297 299 7177
3609             1                301 299 295 7177
3610             1                326 321 320 7177
3611             1                319 312 311 7177
3612             1                315 310 305 7177
```

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12345678901234567890123456789012345678901234567890123456789012345

3701 055 055 065 2 2 19 068 130  097 096 102 109 5467 1
3702             2                112 128 131 3267
3703             2                121 120 118 6267
3704             2                115 115 117 7177
3705             2                107 114 113 7177
3706             2                111 106 107 7177
3707             1                079 078 080 7177
3708             1                076 075 076 7177
3709             1                081 077 079 7177
3710             1                079 078 083 7567
3711             1                075 074 077 6567
3712             1                082 081 080 7277
3801 075 075 045 1 1 18 068 129  024 024 023 025 6256 1
3802             1                026 025 026 6266
3803             1                028 027 028 6266
3804             1                028 027 026 6266
3805             1                028 027 027 7177
3806             1                028 028 028 7177
3807             2                016 018 019 7177
3808             2                020 021 021 7277
3809             2                023 021 022 7277
3810             2                022 022 022 7277
3811             2                023 025 025 7267
3812             2                025 025 025 7277
3901 060 050 063 1 2 19 070 160  038 042 043 043 6256 1
3902             1                044 044 044 5266
3903             1                044 045 045 6166
3904             1                052 051 053 7167
3905             1                049 047 047 7266
3906             1                046 043 044 7266
3907             2                025 024 025 6176
3908             2                028 029 030 7166
3909             2                028 026 026 7177
3910             2                028 027 028 7166
3911             2                029 030 029 7167
3912             2                029 029 028 7166
4001 045 038 040 2 1 18 073 165  083 084 086 083 5237 2
4002             2                081 079 080 5347
4003             2                079 083 082 7167
4004             2                079 081 080 7177
4005             2                080 081 082 7177
4006             2                080 082 082 7177
4007             1                045 045 044 7177
4008             1                045 047 049 7177
4009             1                051 052 053 7177
4010             1                058 057 061 7177
4011             1                062 060 060 7177
4012             1                062 063 064 7177
```

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12345678901234567890123456789012345678901234567890123456789012345

4101 050 055 045 2 1 21 072 185  122 124 132 133 4434 2
4102              2                 145 137 136 5355
4103              2                 134 139 140 5355
4104              2                 133 148 144 6266
4105              2                 133 134 133 6256
4106              2                 133 140 138 7166
4107              1                 120 124 125 6266
4108              1                 124 124 125 6266
4109              1                 125 122 122 6266
4110              1                 125 122 122 6266
4111              1                 127 126 128 6177
4112              1                 128 129 131 7176
4201 040 045 045 2 2 21 063 130  107 100 101 097 6446 1
4202              2                 110 109 108 5456
4203              2                 114 115 113 6257
4204              2                 116 111 113 7367
4205              2                 113 109 111 7267
4206              2                 111 105 106 6277
4207              1                 095 091 091 6267
4208              1                 095 090 094 6266
4209              1                 096 093 093 6266
4210              1                 096 095 098 4356
4211              1                 094 092 093 5346
4212              1                 098 092 094 6367
4301 045 045 039 2 2 18 068 220  087 118 114 112 4424 1
4302              2                 114 105 109 5534
4303              2                 126 119 120 5545
4304              2                 123 121 120 5345
4305              2                 124 120 125 6255
4306              2                 128 129 130 6266
4307              1                 073 075 075 6266
4308              1                 085 091 092 6266
4309              1                 094 092 094 6166
4310              1                 089 090 087 7166
4311              1                 106 100 099 7166
4312              1                 105 099 100 7266
4401 075 070 075 1 2 20 066 120  028 029 029 030 6166 1
4402              1                 032 032 032 6266
4403              1                 033 033 033 5356
4404              1                 033 031 031 5246
4405              1                 031 032 032 4335
4406              1                 033 032 032 6256
4407              2                 020 021 020 6266
4408              2                 021 022 023 6266
4409              2                 024 024 024 6266
4410              2                 025 027 027 7166
4411              2                 028 029 029 7166
4412              2                 029 028 028 7266
```

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12345678901234567890123456789012345678901234567890123456789012345

4501 060 070 061 2 2 23 064 140   049 066 061 062 7157 3
4502               2                  056 062 063 7177
4503               2                  068 067 069 7177
4504               2                  062 063 063 7177
4505               2                  067 079 080 7177
4506               2                  084 090 079 7177
4507               1                  059 067 064 7177
4508               1                  054 053 054 7177
4509               1                  065 069 077 7177
4510               1                  082 089 095 7167
4511               1                  079 082 078 7177
4512               1                  073 070 069 7177
4601 085 040 043 1 1 26 074 178   041 055 057 058 6256 3
4602               1                  061 062 063 6256
4603               1                  064 071 069 6266
4604               1                  077 074 071 6266
4605               1                  076 077 074 6266
4606               1                  076 072 069 6267
4607               2                  046 050 049 6266
4608               2                  066 063 062 6266
4609               2                  069 068 066 6266
4610               2                  071 070 071 6266
4611               2                  073 070 070 6266
4612               2                  068 070 068 6266
4701 045 042 030 2 1 37 068 196   027 030 028 029 6245 3
4702               2                  038 040 040 6255
4703               2                  039 040 040 5255
4704               2                  041 042 043 6255
4705               2                  045 046 045 6255
4706               2                  044 043 044 5255
4707               1                  022 024 024 6255
4708               1                  028 029 029 5255
4709               1                  031 032 032 5255
4710               1                  037 036 036 5255
4711               1                  037 037 036 5255
4712               1                  039 042 042 5255
4801 043 043 059 2 2 33 067 135   093 092 101 081 6255 3
4802               2                  112 101 091 5355
4803               2                  123 110 105 5255
4804               2                  100 091 090 5255
4805               2                  134 136 120 5355
4806               2                  125 118 113 5255
4807               1                  079 085 082 5355
4808               1                  096 090 082 5355
4809               1                  090 066 065 5256
4810               1                  102 097 096 5455
4811               1                  109 096 090 5355
4812               1                  108 106 106 5255
```

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12345678901234567890123456789012345678901234567890123456789012345

4901 074 057 059 1 2 18 061 110  009 014 017 018 5344 3
4902             1                  019 019 019 5354
4903             1                  021 020 020 5444
4904             1                  021 021 022 4444
4905             1                  022 022 022 5244
4906             1                  024 024 024 5255
4907             2                  010 011 011 6244
4908             2                  013 014 014 5344
4909             2                  015 015 015 6255
4910             2                  016 016 016 6255
4911             2                  017 016 016 6265
4912             2                  017 017 016 6344
5001 030 040 032 2 2 18 066 135  027 030 030 029 4544 3
5002             2                  041 037 039 4455
5003             2                  041 039 039 5355
5004             2                  042 040 040 5355
5005             2                  041 041 042 5355
5006             2                  043 043 044 5355
5007             1                  020 024 025 5255
5008             1                  029 031 029 5255
5009             1                  032 032 032 5255
5010             1                  038 036 039 5554
5011             1                  040 039 037 5455
5012             1                  041 038 040 5355
5101 065 060 037 1 2 19 068 145  048 048 042 046 2624 3
5102             1                  052 057 055 3633
5103             1                  068 065 068 3533
5104             1                  073 076 078 3544
5105             1                  073 073 072 4454
5106             1                  073 082 081 5455
5107             2                  072 076 073 5355
5108             2                  075 073 073 5355
5109             2                  073 076 075 6355
5110             2                  078 078 079 6355
5111             2                  078 085 079 6355
5112             2                  085 081 086 6256
5201 073 043 044 1 1 22 072 160  137 131 126 127 5354 3
5202             1                  147 159 152 5266
5203             1                  155 141 141 6245
5204             1                  157 165 162 6266
5205             1                  150 148 148 6266
5206             1                  157 160 159 7266
5207             2                  129 126 129 6276
5208             2                  125 118 117 7235
5209             2                  121 124 121 6423
5210             2                  120 116 115 6554
5211             2                  118 116 118 6355
5212             2                  120 114 117 6266
```

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12345678901234567890123456789012345678901234567890123456789012345

5301 018 035 044 2 2 19 064 130  047 051 058 061 7576 3
5302             2                  069 059 055 7477
5303             2                  079 080 076 7477
5304             2                  093 087 084 7377
5305             2                  089 086 082 7337
5306             2                  086 082 085 7357
5307             1                  058 059 059 7267
5308             1                  062 062 061 7376
5309             1                  064 064 064 7376
5310             1                  061 062 064 6667
5311             1                  064 062 063 6467
5312             1                  070 071 069 7377
5401 045 045 043 2 2 18 067 150  094 111 106 099 5234 3
5402             2                  102 095 098 4345
5403             2                  103 105 102 5255
5404             2                  105 101 096 5255
5405             2                  100 100 098 5266
5406             2                  099 101 099 6166
5407             1                  105 103 099 4345
5408             1                  094 092 093 6255
5409             1                  096 092 094 3545
5410             1                  096 092 091 2534
5411             1                  094 092 090 3545
5412             1                  092 090 089 4545
5501 027 048 053 2 1 18 073 170  068 068 069 070 6166 3
5502             2                  077 076 075 6166
5503             2                  086 087 085 6177
5504             2                  084 090 090 6177
5505             2                  085 085 085 6177
5506             2                  088 092 090 7177
5507             1                  062 066 069 6167
5508             1                  073 077 078 7177
5509             1                  081 083 083 7177
5510             1                  092 091 091 7167
5511             1                  102 101 100 6266
5512             1                  106 105 104 6267
5601 048 045 044 2 1 19 073 155  179 187 186 187 5255 3
5602             2                  195 197 192 6255
5603             2                  194 194 196 6266
5604             2                  192 187 185 6266
5605             2                  178 176 173 6266
5606             2                  171 168 165 6266
5607             1                  146 151 149 6266
5608             1                  155 152 151 6266
5609             1                  151 150 152 6266
5610             1                  155 154 156 6266
5611             1                  159 159 161 6266
5612             1                  158 158 155 6266
```

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12345678901234567890123456789012345678901234567890123456789012345

5701 073  044  044  1  1  20  069  163   053  071  071  069  4554  3
5702                1                        091  085  083  4443
5703                1                        087  086  086  4444
5704                1                        088  087  086  4554
5705                1                        090  092  092  4444
5706                1                        096  093  097  4336
5707                2                        069  068  065  5555
5708                2                        069  074  078  5555
5709                2                        080  079  079  5555
5710                2                        082  081  080  6655
5711                2                        080  079  083  6555
5712                2                        088  082  085  6456
```